

What is claimed is:

- 1 1. A method comprising:
2 receiving a video stream comprising a plurality of image frames, each image
3 frame comprising a matrix of pixels;
4 selecting a subset of the image frames;
5 for each image frame in the subset determining a sub-fingerprint for the
6 image frame; and
7 assembling the sub-fingerprints into a fingerprint for the video stream.
- 1 2. The method of claim 1, further comprising:
2 transmitting the fingerprint to a fingerprint verification system; and
3 comparing the fingerprint to a predetermined fingerprint for the video
4 stream.
- 1 3. The method of claim 1, wherein selecting the subset of the image frames
2 includes reading control codes from the video stream, said control codes identifying
3 the subset of the image frames.
- 1 4. The method of claim 1 wherein determining a sub-fingerprint for the image
2 frame comprises:
3 computing a discrete cosine transformation (DCT) block for a pixel block
4 surrounding a pixel, said DCT block having coefficients;
5 computing an estimation of a variance of the coefficients;
6 setting a variance value in a variance matrix with the estimation of the
7 variance, wherein the value is set at a position in the variance matrix corresponding
8 to the pixel position in the image frame matrix;
9 determining a minimum variance value in a signature window of the
10 variance matrix enclosing the pixel position; and
11 setting a first predetermined value representing the minimum variance in a
12 constellation matrix at a position corresponding to the minimum variance value and

13 setting all other positions in the signature window to a different predetermined
14 value.

1 5. The method of claim 4, further comprising encoding the sub-fingerprint.

1 6. The method of claim 5, wherein the encoding comprises a run-length
2 encoding.

1 7. The method of claim 4, wherein the DCT block has a size of eight by eight.

1 8. The method of claim 4, wherein the signature window has a size of eight by
2 eight.

1
2 9. A device comprising:
3 a processor;
4 a network interface module operable to receive video data, the video data
5 comprising a plurality of frames, each frame comprising a pixel matrix;
6 a memory coupled to the processor for storing the pixel matrix, a variance
7 matrix, and a constellation matrix; and
8 a fingerprint generation module executing on the processor and operable to:
9 determine a discrete cosine transformation (DCT) block for a pixel
10 block surrounding a pixel in the pixel matrix, said DCT block having
11 coefficients;
12 compute an estimation of a variance of the coefficients;
13 set a variance value in the variance matrix with the estimation of the
14 variance, wherein the value is set at a position in the variance matrix
15 corresponding to the pixel position in the image frame matrix;
16 determine a minimum variance value in a signature window of the
17 variance matrix enclosing the pixel position; and

18 set a first predetermined value representing the minimum variance in
19 the constellation matrix at a position corresponding to the minimum variance
20 value and setting all other positions in the signature window to a different
21 predetermined value.

1 10. The device of claim 9, wherein the fingerprint generation module is further
2 operable to run-length encode the sub-fingerprint.

1 11. The device of claim 9, wherein the DCT block has a size of eight by eight.

1 12. The device of claim 9, wherein the signature window has a size of eight by
2 eight.

1 13. The device of claim 9 further comprising a DCT accelerator operable to
2 calculate the DCT coefficients.

1 14. The device of claim 9, wherein the processor and memory are housed in a
2 set-top box.

1 15. The device of claim 9, wherein the processor and memory are housed in a
2 personal computer.

1 16. A system comprising
2 a video server communicably coupled to a communication channel and
3 operable to transmit a video data stream through the communication channel;
4 a video receiver communicably coupled to the communication channel and
5 operable to:
6 receive the video data stream;
7 determine a subset of images in the video data stream;
8 calculate a sub-fingerprint for each of the subset of images;

9 assemble the sub-fingerprint for each of the subset of images into a
10 fingerprint; and
11 transmit the fingerprint to a fingerprint verification module.

1 17. The system of claim 16, further comprising a fingerprint mismatch database
2 operable to store a reference fingerprint for the video data stream and wherein the
3 fingerprint verification module is operable to compare the fingerprint to the
4 reference fingerprint.

1 18. The system of claim 16, wherein the fingerprint verification module is
2 located with the video server.

1 19. A machine-readable medium having machine executable instructions for
2 performing a method, the method comprising:
3 receiving a video stream comprising a plurality of image frames, each image
4 frame comprising a matrix of pixels;
5 selecting a subset of the image frames;
6 for each image frame in the subset determining a sub-fingerprint for the
7 image frame; and
8 assembling the sub-fingerprints into a fingerprint for the video stream.

1 20. The machine-readable medium of claim 19, wherein the method further
2 comprising:
3 transmitting the fingerprint to a fingerprint verification system; and
4 comparing the fingerprint to a predetermined fingerprint for the video
5 stream.

1 21. The machine-readable medium of claim 19, wherein selecting the subset of
2 the image frames includes reading control codes from the video stream, said control
3 codes identifying the subset of the image frames.

1 22. The machine-readable medium of claim 19 wherein determining a sub-
2 fingerprint for the image frame comprises:
3 computing a discrete cosine transformation (DCT) block for a pixel block
4 surrounding a pixel, said DCT block having coefficients;
5 computing an estimation of a variance of the coefficients;
6 setting a variance value in a variance matrix with the estimation of the
7 variance, wherein the value is set at a position in the variance matrix corresponding
8 to the pixel position in the image frame matrix;
9 determining a minimum variance value in a signature window of the
10 variance matrix enclosing the pixel position; and
11 setting a first predetermined value representing the minimum variance in a
12 constellation matrix at a position corresponding to the minimum variance value and
13 setting all other positions in the signature window to a different predetermined
14 value.

1 23. The machine-readable medium of claim 22, wherein the method further
2 comprises encoding the sub-fingerprint.

1 24. The machine-readable medium of claim 23, wherein the encoding comprises
2 a run-length encoding.

1 25. The machine-readable medium of claim 22, wherein the DCT block has a
2 size of eight by eight.

1 26. The machine-readable medium of claim 22, wherein the signature window
2 has a size of eight by eight.